VGLUT3 rare mutant and vulnerability to addiction (ADIKHUMICE)

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Addiction is a compulsive pattern of drug-seeking/drug-taking behavior that takes place at the expense of most other activities. It leads to a loss of control despite negative consequences and reoccurring episodes of abstinence and relapse. Millions of people are affected by addiction to alcohol, drugs, gambling or sex. The economic costs for our society is tremendous. Despite this socio-economical burden we critically lack effective treatment. To make progress in the treatment of this devastating pathology we urgently need an in-depth understanding of the cellular and molecular mechanism underlying addiction. The key to understand and treat addiction lies in understanding the brain reward system.
As in the entire brain, neurons from the reward system use a combination of electrical and chemical signals to communicate with each other. These chemical messengers are called neurotransmitters. The neurotransmitters: dopamine, acetylcholine and glutamate are key players in addiction. Until recently, it was believed that neurons use only one neurotransmitter to signal. We made the surprising discovery that a small population of neurons from the reward system can use 2 transmitters (namely glutamate and acetylcholine) to communicate with other neurons, suggesting that they are functionally bilingual. Furthermore, we have recently shown that perturbation of these bilingual neurons dramatically increases vulnerability to addiction. The aim of our study is to extend these preliminary results in order to better understand the neuronal mechanisms underlying addiction. This study could lead to the establishment of alternative medications for the treatment of addiction.